Remarks

The various parts of the Office Action (and other matters, if any) are discussed below under appropriate headings.

Status of Claims

Claims 1-15 and 17-61 are pending. Claim 16 has been cancelled without prejudice or disclaimer of the subject matter contained therein.

Claims 1-15 are found in the original issued patent, and claims 17-61 were added via the preliminary amendment filed on December 14, 2001.

Amendments have been made to claims 17, 20, 22, 24, 25, 28, 29 and 31. The nature of these amendments is discussed below.

Support for Claim Changes

The support for additional claims 17-61 remains the same as that enumerated in the reissue application filed on December 14, 2001.

Claim Objections

Claims 28, 29 and 31 were objected to for lacking antecedent basis. These claims have been amended for clarity. Accordingly, the objection should be withdrawn.

Claim Rejections - 35 USC § 112, 2nd ¶

Claims 16-39 were rejected as being indefinite for failing to particularly point out an distinctly claim the subject matter that applicant regards as the invention. In particular, the Office Action objects to the use of "time-frequency analysis" because the written description does not clearly define the claim term. For at least the reasons set forth below, it is respectfully submitted that the rejection should be withdrawn.

According to MPEP 2173.02, "a claim term that is not used or defined in the specification ***is not indefinite*** if the meaning of the claim term is discernible." *Bancorp Services, L.L.C. v. Hartford Life Ins. Co.*, 69, USPQ2d 1996, 1999-2000 (Fed. Cir. 2004) (emphasis added).

In the instant case, it is respectfully submitted that the meaning of the term "time-frequency analysis" is discernible to one of ordinary skill in the art. A skilled artisan would understand this term to mean analysis of a signal represented over both time and

frequency (see Exhibit A) and/or analysis that determines frequency components of a time domain signal. In addition, this term is used in many patents, including, e.g., U.S. Patent Nos. 6,208,949, 6,507,798 and 6,775,007 (see col. 5, lines 30-34, which discloses "[s]ignal from different depth locations could than be separated by computing fast Fourier transform (FFT) of the detected signal, or by any other time-frequency analysis method (e.g., filter banks, matched filtering, chirping, etc.). As further evidence of the discernability of "time-frequency analysis," Exhibit B includes a listing for a reference book, entitled *Time-frequency analysis: theory and applications.*

For at least these reasons, it is respectfully submitted that the use of "time-frequency analysis" does not render claims 17-39 (claim 16 is now cancelled) indefinite. Accordingly, the rejection should be withdrawn.

Terminal Disclaimer

Claims 16-26 were rejected on the grounds of nonstatutory obviousness-type double patenting in view of commonly-owned U.S. Patent No. 5,994,690. A terminal disclaimer is included herewith, thereby obviating the non-statutory obviousness-type double patent rejection. Accordingly, the rejection should be withdrawn.

Claim Rejections - 35 USC § 102

Claims 16 and 17 were rejected as being anticipated by Cohen et al. (U.S. 5,204,734). Claim 16 has been cancelled and dependent claim 27, which previously depended from claim 16, has been rewritten in independent form. Claims 17, 20, 22, 24 and 25 have been amended to depend from now-independent claim 27. Accordingly, the rejection should be withdrawn.

Allowable Subject Matter

The indication of the allowability of claims 1-15 and 40-61 is acknowledged with thanks.

Conclusion

In view of the foregoing, request is made for timely issuance of a notice of allowance.

Respectfully submitted,

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Time-frequency representation

EXHIBIT
A

From Wikipedia, the free encyclopedia
(Redirected from Time-frequency analysis)

A **time-frequency representation (TFR)** is a view of a signal (taken to be a function of time) represented over both time and frequency. **Time-frequency analysis** means analysis of a TFR.

A signal, as a function of time, may be considered as a representation with perfect temporal resolution. The magnitude of the Fourier transform (FT) of the signal may be considered as a representation with perfect spectral resolution but with no temporal information (although the magnitude of the FT conveys frequency content, it fails to convey where in time different events occur in the signal). TFRs provide some temporal information and some spectral information, simultaneously. Thus, TFRs are used for the analysis of signals containing multiple time-varying frequencies.

One form of TFR can be formulated by the multiplicative comparison of a signal with itself, expanded in different directions about each point in time. Such formulations are known as quadratic TFRs because the representation is quadratic in the signal. This formulation was first described by Eugene Wigner in 1932 in the context of quantum mechanics and, later, reformulated as a general TFR by Ville in 1948 to form what is now known as the Wigner-Ville distribution. Unfortunately, although quadratic TFRs offer perfect temporal and spectral resolutions simultaneously, the quadratic nature of the transforms creates cross-terms whenever multiple frequencies are superimposed. This was partly addressed by the development of the Choi-Williams distribution in 1989 but most recent applications of TFRs have turned to linear methods.

The cross-terms which plague quadratic TFRs may be evaded by comparing the signal with a different function. Such representations are known as linear TFRs because the representation is linear in the signal. The *windowed Fourier transform* (also known as the short-time Fourier transform) localises the signal by modulating it with a window function, before performing the Fourier transform to obtain the frequency content of the signal in the region of the window. Wavelet transforms, in particular the continuous wavelet transform, expand the signal in terms of wavelet functions which are localised in both time and frequency. Thus the wavelet transform of a signal may be represented in terms of both time and frequency. Before 1991, the notions of time, frequency and amplitude used to generate a TFR from a wavelet transform were derived intuitively. In 1991, Nathalie Delprat gave the first quantitative derivation of these relationships, based upon a stationary phase approximation.

TFRs are often complex-valued fields over time and frequency, where the modulus of the field represents "energy density" (the concentration of the root mean square over time and frequency) or amplitude, and the argument of the field represents phase.

External links

- DiscreteTFDs — software for computing time-frequency distributions (http://tfd.sourceforge.net/)
- TFTB — Time-Frequency ToolBox (http://tftb.nongnu.org/)

Retrieved from "http://en.wikipedia.org/wiki/Time-frequency_representation"

Category: Signal processing

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EXHIBIT

B

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